

FORUM : DEVELOPMENT

ISSUE : FINDING A BALANCE BETWEEN INDUSTRIALIZATION AND GREENHOUSE EMISSIONS

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## Introduction

*“In tough times, some of us see protecting the climate as a luxury, but that’s an outdated 20th-century worldview from a time when we thought industrialization was the end goal, waste was growth, and wealth meant a thick haze of air pollution.”*

-Alex Steffen



1

Ever since the start of the industrial revolution in 1760, greenhouse gas emissions have been steadily creeping up. However, ever since the start of the second industrial revolution in the late 19th century, emissions have skyrocketed : CO<sub>2</sub>, the main greenhouse gas, has seen its emission increase tenfold from the 18th century to mid-19th century (from 5 million tons of CO<sub>2</sub> per year to 54 million). We are currently emitting 8000 million tonnes of CO<sub>2</sub> every year. The rapid increase of greenhouse gases is directly related to global warming, and to some extent ozone depletion in the stratosphere. Industry is responsible for 23% of emissions. Considering the steady rise of temperatures, the rising sea levels, the destruction of ice caps and ecosystems, it is clear that these emissions are a threat.

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<sup>1</sup> Picture Source : elp.com

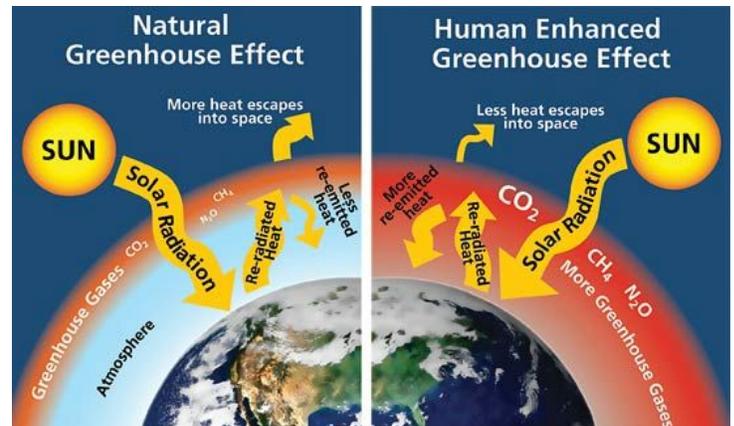


## Definition of Key Terms

- **Greenhouse Gases and the Greenhouse Effect**

A greenhouse gas is a gas in an atmosphere that has the capacity to absorb and emit radiation within the thermal infrared range (not visible to the human eye). These gases, most notably carbon dioxide (CO<sub>2</sub>), water vapour (H<sub>2</sub>O), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O) and ozone (O<sub>3</sub>), are responsible for the greenhouse effect, a naturally occurring phenomenon that serves to heat up the Earth's surface. Without it, average temperatures would be -1°C instead of 14°C. The most present greenhouse gas is CO<sub>2</sub>, a common byproduct of human activity.

<sup>2</sup>



- **Industrialization**

The process of transforming a primarily agricultural country into one based on the manufacturing of goods and services. Assembly lines replace craftsman, and manual labor replaced by mechanized mass production. Common characteristics of industrialization also include more efficient divisions of labour, and the use of technology to solve problems instead of superstition or luck.

Due to the important demand for workers living near factories, large towns and cities were formed in order to house them. These expanded to become megacities, with all the environmental hazards that they create.

- **Climate Change**

Climate Change is a gradual increase in the temperature of Earth's atmosphere, mostly due to the greenhouse effect caused by greenhouse gases. This phenomenon has massive effects on human life, from the reduction of liveable space due to rising sea levels, to heat waves causing the deaths of hundreds around the world.

- **Fossil Fuels**

The three main fossil fuels used are coal, oil and natural gas. They are formed by decayed plants and animals that have been converted by heat and pressure in the Earth's crust for hundreds of million of years. This means that they are a finite resource that will eventually

<sup>2</sup> Shows the difference between the natural greenhouse effect and the human enhanced one.

Source : [www.livescience.com/](http://www.livescience.com/)



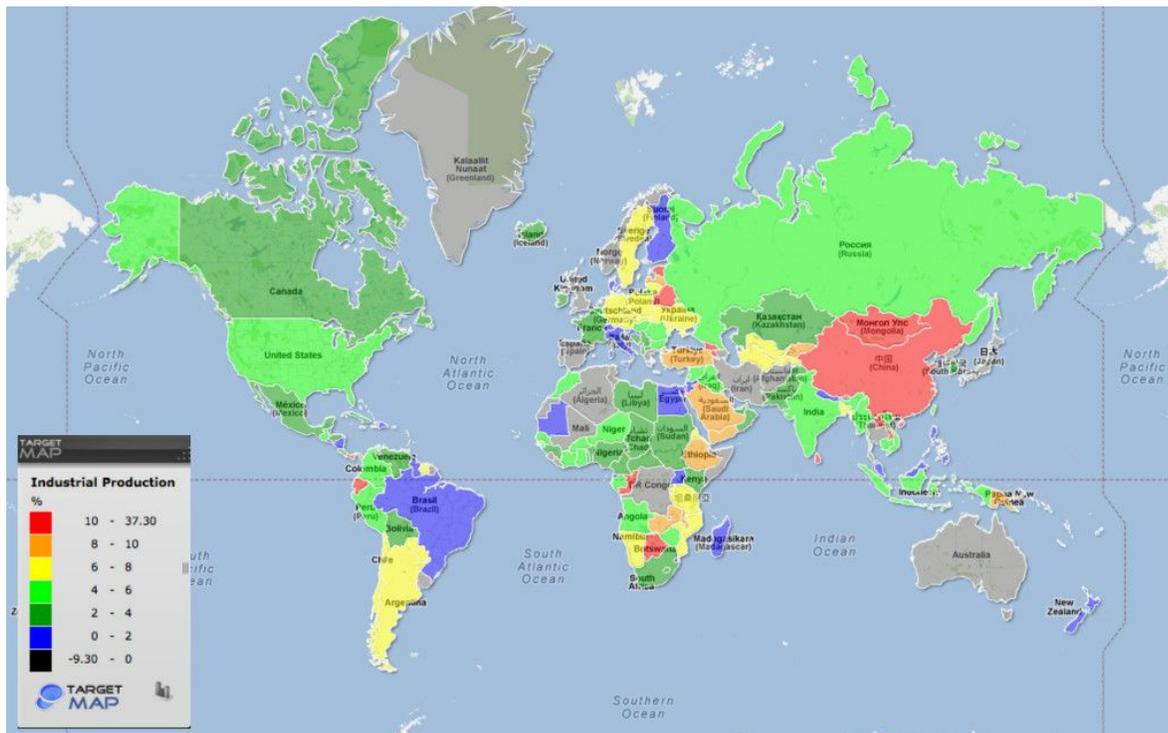
run out, unlike solar power for example. When they are burned, they produce large amounts of energy, making them excellent for industrial purposes. However, they are the largest source of greenhouse gases.

- **Carbon Pricing**

Carbon pricing is the act of putting a monetary value, a tax, on the production of carbon dioxide. This would serve to reduce the production of CO<sub>2</sub>, the main greenhouse gas. This tax will be debated upon in December 2015 in Paris.

## Background Information

Human activity since the Industrial Revolution (1750) has led to a 40% increase in the concentration of carbon dioxide (CO<sub>2</sub>) in the atmosphere. This has led to increasing temperatures (1999-2009 was the hottest decade ever since 1880 (keeping in mind records began in 1825)). It is estimated that the earth could warm by an additional 7.2 degrees Celsius in the 21st century, which could lead to disastrous consequences.

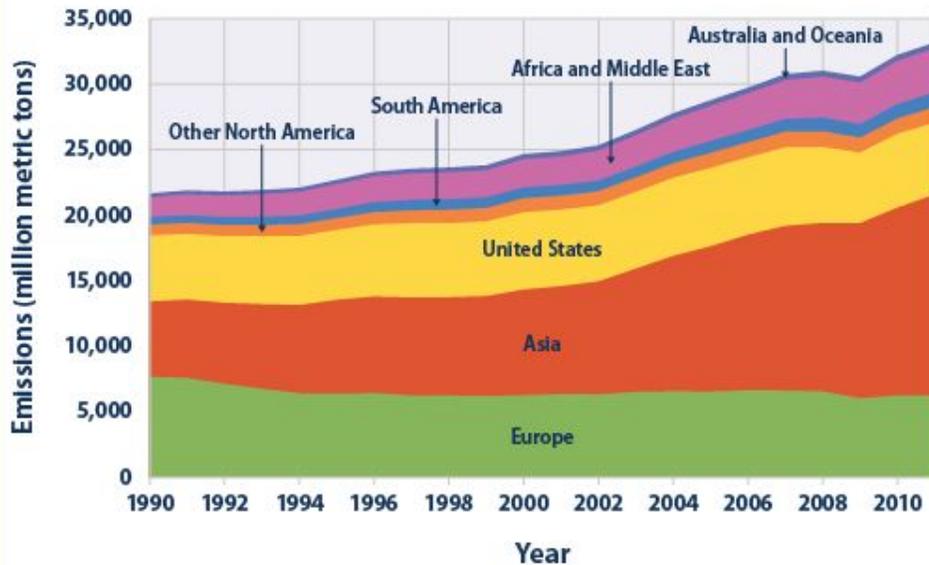


<sup>3</sup> 3 Industrial Production Growth in 2010-2011  
Source : Targetmap.com



The industrial revolution may have started in Great Britain, however nowadays developing countries such as China, India and Brazil are pushing towards becoming industrial superpowers. In fact, China is the single richest country in terms of industrial output, followed by the EU and the United States of America. It is clear that industrialization is spreading and will not stop soon, as population, and thus demand, keeps on rising.

4



With **industrialization** comes mass-production, and a necessity for everyday workers to own cars, a house, and other products. They also need electricity. To date, the fastest way to produce energy in a cost-effective manner is the burning of **fossil fuels**, resulting in large emissions of CO2. In fact, a quarter of the CO2 being released in the atmosphere comes from energy production.

Two of the five countries who consume the most energy are India and China, both countries that are currently being industrialized, and the other three are industrialized countries. Today industrialization generally entails money : the GNI (gross national income) of Belgium, a developed country is 47 030 US dollars, whilst the GNI of Bangladesh, a developing country, is only 1,080 US dollars.

Considering the consequences that **industrialization** has had on the world, it seems necessary to control the emissions of **greenhouse gases**, in order to prevent **global warming** from reaching a point of no return. Ever since the start of the industrial revolution, the Earth's temperature has risen by 1.6 degrees Fahrenheit. This may not seem like much, but an additional 0.4 degrees could result in unprecedented changes in global climate and a significant increase in the severity of natural disasters : the point of no return. This could be reached as early as 2042. According to Greenpeace, we have to start cutting back on gas emissions as early as 2020. This is why global leaders are having a meeting in Paris in

<sup>4</sup> Shows the emissions of CO2 by continents/countries

Source : [www.epa.gov/climatechange/science/indicators/ghg/global-ghg-emissions.html](http://www.epa.gov/climatechange/science/indicators/ghg/global-ghg-emissions.html)



December 2015 : to introduce **carbon pricing**, the seemingly best way to cut back on CO2 emissions. Other solutions to cutting back on CO2 emissions would be to transform our energy system to one that is less dependant on fossil fuels, and to increase vehicle fuel efficiency. These projects are all being undertaken : we can see this in the UK's offshore wind farm, and the slow introduction of electrical or hybrid cars.

## Consequences of Greenhouse Gas Emissions

The short answer is global warming, and the destruction of the ozone layer (there has been a 4% decline in the volume of ozone in the stratosphere, and holes in the ozone layer appear over polar regions in spring. The main cause for the destruction of ozone is the presence of atomic halogens, which come from man-made chemicals used in refrigerants, solvents and propellants) Temperatures would increase, along with sea levels due to the melting ice caps. Precipitations will become more frequent, along with heat waves. The increase in air pollution and temperatures would cause more strokes and cancers, along with other various health issues. The world as we know it would drastically change, and no-one would be left untouched, whether it be by the migrant waves that will seek to escape the rising sea (44% percent of the world's population live closer than 150 kilometres to the sea. 200 million people live only 5 metres higher than current sea levels) or by the more frequent natural disasters. The WHO (World Health Organization) estimates that between 2030 and 2050, climate change will cause an additional 250 000 deaths per year. This number will continue to ramp up, and does not take into account deaths from natural disasters.

The important word in "Global Warming" is truly "Global". This phenomenon affects everyone, from the American middle-class, to the impoverished African countries, to the endangered species living around the Earth. According to the WWF (World Wide Fund) several species have already gone extinct, or have a gene pool too limited to expand their population, as a direct result to global warming.

## Major Countries And Organisations Involved

According to the EPA (United States Environmental Protection Agency), the largest producers of CO2 in 2008 were China, the United States and the European Union. India also has a large part in the global production of CO2. This goes to show that industrialized countries, or countries pushing their industrialization are primarily at fault. However, tropical deforestation



in Africa, South America and Asia are thought to be the largest sources of emissions from land-based sources.

The G8 (a group composed of the 8 wealthiest developed countries on Earth) is also extremely important and influential. The members that compose it are some of the biggest producers of greenhouse gases, and are extremely industrialized. However, their goals are thought to be far too small by many environmentalists.

The Group of 77 (or G77) is composed currently of 134 developing countries, including China and India. They aim to help each other's "economic interests". Since developing countries have the potential to create enormous amounts of CO<sub>2</sub> and other gases, this Group is of capital importance.

Greenpeace is one of the most important organizations in the fight against climate change. Even if their activism is seen as dangerous by some, they still hold a lot of public support.

## Timeline of Events :

**1824** : French scientist Joseph Fourier describes the "greenhouse effect" for the first time.

**1979** : The first World Climate Conference was held

**1992** : 154 countries sign the FCCC (United Nations Framework Convention on Climate Change)

**1997** : 159 countries sign the Kyoto treaty.

**2006** : Carbon emissions from fossil fuel burning and industry reach eight billion tonnes per year

**2007** : G8 leaders agree to cut global greenhouse gas emissions by 80% for 2050,

**2009** : China becomes the biggest greenhouse gas emitter, mainly through its industry



**2011** : UN signs a treaty to limit greenhouse gas emissions

**2014** : The Rockefeller Brothers Fund agrees to not invest in the fossil fuel industry anymore, marking the beginning of large organizations and industries pulling out of polluting sectors

## Relevant UN Treaties and Events

**FCCC** : The FCCC (Framework Convention on Climate Change) sets a framework for countries involved in order to better take on the global problem that is climate change.

**The Kyoto Protocol** : The Kyoto Protocol is an international treaty and extension the FCCC that forces all involved parties to reduce greenhouse gas emissions. It recognizes that human CO<sub>2</sub> emissions are the principal for global warming.

**Copenhagen Accord** : An agreement between world leaders to pledge specific actions they will set in motion in order to lower greenhouse gas emissions.

**United Nations Climate Change Conference** : The 20th yearly session of the COP20 (Conference of Parties). This was the last session of the COP20 before the Paris conference. Greenhouse gas emissions were the main subject of the conference : the goal being to reduce emissions.

## Previous Attempts to Resolve the Issue

Over the years, many countries have pledged to cut back on CO<sub>2</sub> emissions. For example, in 2007 G8 leaders promised to cut back on emission by 80% for 2050. This was heavily critiqued however, as they did not set specific goals and ideas, meaning that many consider this pledge to be an empty promise.

The Kyoto Protocol is perhaps the biggest effort to date to slow down emissions. It forces countries, especially developed ones, to reach certain targets. However, its effectiveness



is questionable : whilst many countries have been able to reach their goals, the curve on CO2 emissions has been steadily climbing up.

In 1992, the “Earth Summit” gave birth to the United Nations Framework Convention on Climate Change (UNFCCC or FCCC), the precursor to the Kyoto Protocol. This was the first true step to tackling the problem.

Carbon pricing was first thought of in 1920 by Arthur Pigou. It has since been adopted by environmentalists as the the preferred method to reduce gas emissions. However, it has not been introduced at a significant international level. This method will be discussed at the 2015 Paris conference.

## Possible Solutions

As mentioned before, carbon pricing is considered to be the best method to solve this issue. Indeed, industrialization is heavily dependent on money. Currently, the best and cheapest method to produce power, to make cars work, and to produce at huge scales is to use fossil fuels. However, if that method becomes more expensive than more environment-friendly methods, then we would be seeing more solar farms and electric cars. This can already be seen to some extent due to the rising price of fuel : countries like the UK and France have created huge wind farms, or rely on nuclear energy.

Since green energy will not be able to implement itself immediately, adopting more efficient means of handling fossil fuels, or hybrid systems, is the immediate go-to answer. Industrialized countries are home to huge amounts of waste : whether it be in traffic jams or lights staying on all day. This is where normal people can come in. In the end, this problem concerns all human beings.

## Appendices

<http://www.un.org/en/globalissues/climatechange/>

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